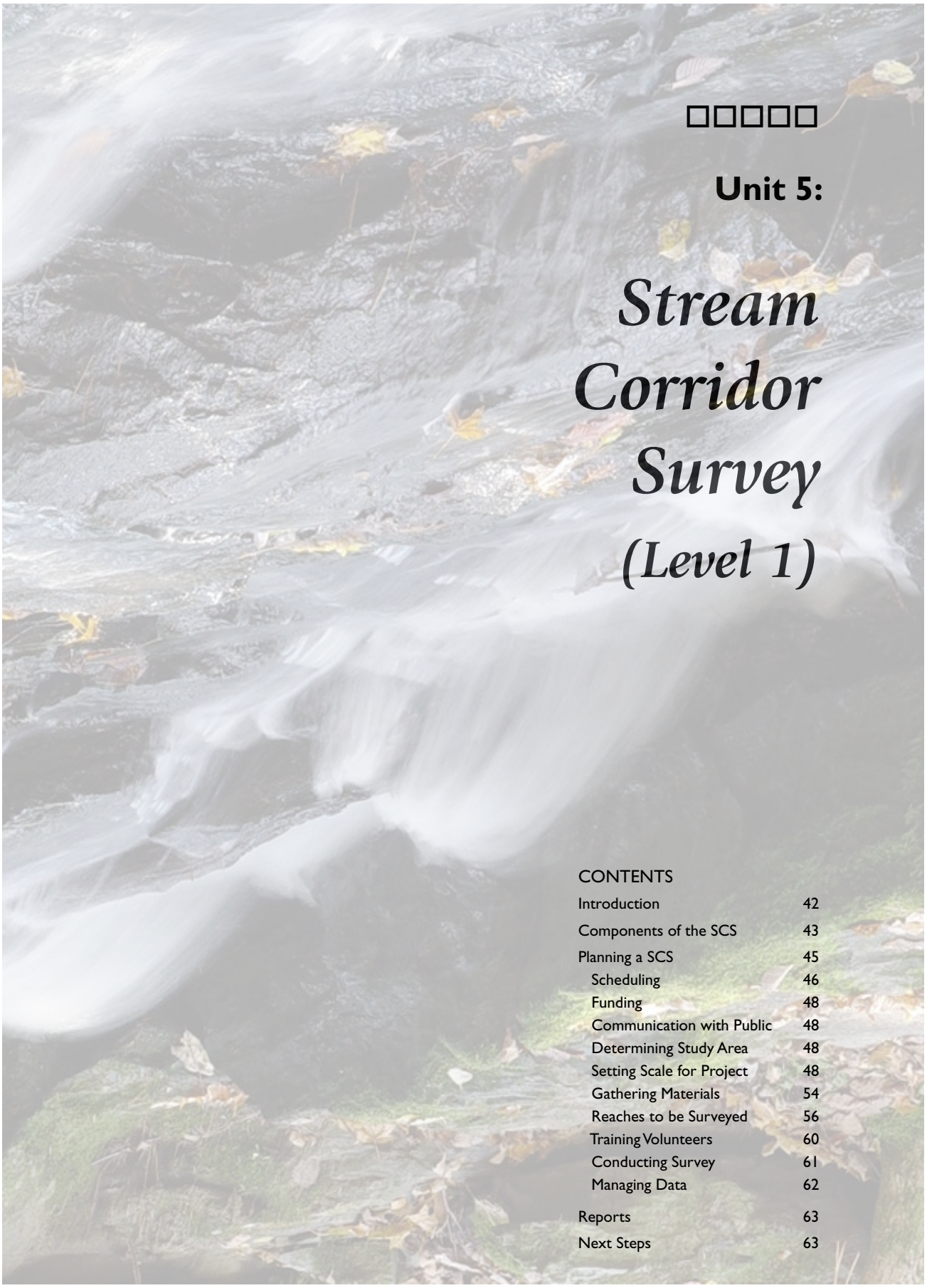


Unit 5:

Stream Corridor Survey (Level 1)

CONTENTS

Stream Corridor Survey (SCS) is a screening-level, in-stream survey technique for wadable streams.

Unit 5:
Stream Corridor Survey (Level 1)

A. Introduction to a Stream Corridor Survey

The Level 1 Stream Corridor Survey (SCS) is a screening-level, in-stream survey technique for wadable streams created by the Maine Department of Environmental Protection (MDEP) in collaboration with the Maine Department of Inland Fisheries and Wildlife (MDIFW).[1] With more than 45,000 miles of streams and rivers existing in Maine, volunteer participation in SCS efforts helps both agencies target resources toward the streams that most need attention.

Although the purpose of individual surveys varies from group to group, SCS projects typically fulfill the following functions:

- Identify streams, reaches, or sites: having high-quality habitat; having moderately- or highly-degraded (impaired) habitat, or significant pollution problems; that are in need of more detailed follow-up survey or assessment work;
- Promote education and stewardship;
- Provide information useful for the management (protection, rehabilitation, conservation, regulation, etc.) of stream water quality, habitats, fisheries, and riparian lands.

SCSs can vary greatly in scope, depending on the topography, access, length of the stream, number of reaches being surveyed, and the number of surveyors. **This manual is geared towards projects that incorporate the use of a group of volunteers as surveyors.**

It is worth noting that an individual, once trained by either MDEP's Maine Stream Team Program (MSTP) or Maine Department of Inland Fisheries & Wildlife (MDIFW)/Fisheries Research Section staff and comfortable with the survey procedure, may complete stream surveys and submit the data to either the MSTP or MDIF&W Fisheries Research Section independent of an organized stream survey event (see Appendix J for more information).

This is often done by people (such as anglers) who frequently spend time on streams and may incorporate the survey into a particular outing. These people, once trained, may choose to bypass the rest of the information in this unit and move right to the abbreviated instructions and datasheets in Appendix J. This unit is helpful as a refresher.

All other folks (including volunteer group efforts) interested in doing these surveys should continue reading this unit, get trained, and then use Appendix J as a portable field manual.

[1] This technique may have limited use in deeper streams and rivers, since some of the questions (e.g., channel bottom substrate characteristics) will be more difficult to assess and safety concerns might be even greater than normal. Also note that since this is designed to be an in-stream survey, you either need an appropriate water craft or easy access to hike along the banks of the river.

SCSs are **reach-based surveys**, rather than point- or site-based surveys (e.g., watershed survey). A "***reach***" is a relatively homogeneous length of a stream having a repetitious sequence of physical characteristics and habitat types. **This level of information is important screening-level information that identifies a section of a stream that may be experiencing pollution/habitat problems — or may have excellent habitat quality.**

Some groups may also wish to document the location and type of problems or exceptional habitats to a finer precision than at the ***reach*** level. They wish to do this for a variety of reasons including the fact that they might be also conducting a watershed survey of the area and they would like to include detailed, site-specific information from in-stream or riparian locations into their watershed survey report. In this case, groups can bring along a set of additional datasheets called *Site Forms,* which will be discussed later in this unit.

A **reach** is a relatively homogeneous length of a stream having a repetitious sequence of physical characteristics and habitat types.

B. Components of the Stream Corridor Survey

The SCS is a combination of two survey techniques: the **Stream Habitat Survey** and the **Rapid Geomorphic Assessment.** Groups may also complete optional Site Forms during their survey.

■ **STREAM HABITAT SURVEY:** This is an easy-to-use approach for identifying and assessing the elements of a stream's habitat. (It is based on a simple protocol known as *Streamwalk* developed by EPA's Regional Office in Seattle, WA and modified by MDIFW's Fisheries Research Section and MDEP's Maine Stream Team Program.)

The protocol consists primarily of **visual observation** of stream habitat characteristics, basic water quality conditions and potential pollution sources, aquatic life presence, and general physical attributes. A simple **in-stream macroinvertebrate collection** can also be performed, if desired. This approach requires little equipment and only a couple hours of training. It is a useful screening tool for making a preliminary assessment of a stream's overall biological and physical integrity.

A Stream Habitat Survey is most useful for:

- Learning about local stream ecosystems and environmental stewardship opportunities;
- Generating general information and data (descriptive and photographic) about a section of stream;
- Identifying high-quality stream habitat and fisheries/wildlife populations for potential preservation or management efforts;
- Identifying severely degraded habitats, nonpoint source pollution (NPS) problems, or water quality issues, all of which can lead to potential restoration planning and actions.

A Stream Habitat Survey:

• encourages learning about local stream ecosystems and environmental stewardship opportunities;

• generates general information and data about a stream;

• identifys high-quality stream habitat and fisheries/wildlife populations;

• works as a screening tool to identify water quality issues or degraded habitats.

A Rapid Geomorphic Assessment (RGA):

• screens general stability and overall condition of stream reaches;

• identifys reaches having significant sediment sources;

• identifys reaches receiving unusually large volumes of stormwater;

• identifys reaches exhibiting signs of possible alteration by human activities;

Target reaches for further assessment or restoration planning.

■ **RAPID GEOMORPHIC ASSESSMENT (RGA):** This part of the survey gathers basic, screening-level information about the "fluvial geomorphological" characteristics of the stream reach. **Fluvial geomorphology**, in simple terms, is the **study of the shape and stability of river and stream systems.** It assesses not only the form of these watercourses, but also the associated contributing physical processes related to water and sediment transport through stream systems. Advanced assessment techniques can help determine appropriate restoration techniques to use, if necessary. *(For more resources and information, refer to Volume I, Table 3-4, as well as Volume II's discussion of physical characteristics of streams and rivers.)*

RGA is most useful for:

- Screening the general stability and overall condition of stream reaches;
- Identifying reaches having significant sediment sources (e.g., excessive NPS pollution and runoff, bank erosion, or slumping), which may cause channel instability;
- Identifying reaches receiving unusually large volumes of stormwater from sources (e.g., large amounts of impervious surfaces [parking lots, rooftops, roads, etc.]), which may cause channel instability;
- Identifying reaches exhibiting signs of possibly having been altered by other human activities such as channelization, floodplain alteration, riparian zone degradation, etc.;
- Targeting reaches for further assessment or restoration planning.

■ *(Optional)* **SITE FORMS FOR DETAILED SITE DOCUMENTATION:**

The Site Form *(Appendix K)* is designed to **document specific locations** where either NPS pollution, riparian zone degradation, or exceptional coldwater stream habitat sites may occur. This form is designed so that it can be used as the **primary datasheet** in Watershed Surveys, as well as be a supplemental form in Stream Corridor Surveys.

For WS: these types of surveys *(discussed in Unit 6)* can use these Site Forms both on the watershed landscape and near or in streams. (***NOTE:*** WS do not always direct volunteers to walk in or alongside stream reaches, as volunteers do during SCS surveys.)

For SCS: These types of surveys, when using only **SCS datasheets** *(Appendix J)*, assess general conditions at the reach scale, noting problems but not specific locations and problem details. Site Forms are most useful in CS projects for:

- Identifying and recording information about specific locations having NPS pollution or riparian degradation issues or apparently "high-value" habitats within a given stream reach;
- Reducing the number of volunteer hours needed to survey the watershed by making use of SCS volunteers already walking the stream channel;
- Providing data that is comparable to that generated in a watershed survey so that it can be easily used in prioritizing identified sites for restoration projects, etc. (***NOTE:*** Restoration projects should not be attempted, especially in stream channels or on their banks, without professional oversight.)

C. *Planning a Stream Corridor Survey*

The basic steps involved in developing and organizing a survey, including how to determine project leadership and assign responsibilities and how to gather existing data, are described in Unit 3.

The information in this unit is designed to supplement this information with topics specific to SCS planning. These topics include:

- **Scheduling**
- **Securing Funding**
- **Communicating with the public and recruit volunteers**
- **Determining the Study Area and Stream Reach Locations**
- **Gathering Materials (equipment, datasheets, etc.)**
- **Choosing Reaches to Be Surveyed and Assigning Volunteers to Reaches**
- **Training Volunteers**
- **Conducting the Survey**
- **Managing the Data**

The Importance of Steering Committee Meetings

One or two people can usually complete most of the planning tasks listed in section C. Still, it is very important to have at least one or two steering committee meetings in order to keep other committee members in the loop, gather any feedback they may have, iron out any logistical probelms that may arise, etc.

The more that can be accomplished before the actual survey field event, the smoother and more efficient the event will actually be. For example, attempting to prioritize the reaches to be surveyed and trying to assign volunteers and technical leaders to reaches in advance of the survey day, as best as possible, will greatly reduce the amount of organizational time needed before survey teams are sent into the field. Survey training events can be chaotic in the beginning as volunteers arrive, so any effort to be more organized can reduce the amount of time volunteers may waste just standing around waiting for assignments.

Keep in mind that aquatic life is most vulnerable to stressful, warm-water temperatures and, thus, we want to know how well the stream is being shaded during the warmest months of the year.

C1. *SCHEDULING*

The schedule for a SCS is driven by the time of year that you plan to complete the survey. The **best time for conducting these types of surveys is the summer up through the early fall** (before leaf-fall). Keep in mind that aquatic life is most vulnerable to stressful, warm-water temperatures and, thus, we want to know how well the stream is being shaded during the warmest months of the year. Doing surveys before mid-fall (October/November) also helps avoid the spawning season of certain fish and hunting season.

It is also recommended to avoid periods of heavy rains and snowmelt because of the dangerous high flows that commonly are associated with them. If surveys happen to be done before tree and shrub "leaf-out" or after "leaf-fall", make a note of it on the data sheets because the riparian canopy assessments (i.e., shade) will be misleading. It may also be difficult to assess channel bottom characteristics because leaves have accumulated there.

You may need to schedule the survey to **coincide with the needs of your anticipated volunteers.**

The volunteer survey work consists of three parts:

- indoor classroom training,
- outdoor field training, and
- the actual survey.

You may opt to conduct the indoor training (typically about 1.5 - 2.0 hours) prior to the field-work date, depending on the availability of volunteers and time constraints of technical advisors, though most groups do this all on one day.

From start to finish, including designing the survey, recruiting and training volunteers, conducting the survey, submitting the data, and designing a follow-up action plan, a **SCS project's schedule can span at least four to five months,** and often at least a year if the action plan involves writing a final report. *(See Table 3-5 [Unit 3] for estimates of time required to complete SCS projects.* Sample timelines for typical SCSs can be found in **Table 5-2.)**

Table 5-2:

Sample Timelines for Stream Corridor Surveys.

These timelines are not mandatory and are meant to be examples *(for Watershed Survey timelines, see Unit 6)*. Local conditions and logistics will affect timelines. **(Be aware that some grants, such as the Maine DEP "319" grants, may take over a year to submit, be reviewed, possibly awarded, and funded. Plan accordingly. The earlier you can begin the organizing and fund search processes, the greater your chances for a successful and less stressful project.)**

MONTH	TASKS
Example 1	**Stream Corridor Survey (SCS) only**
MARCH–APRIL	• Organize project leadership; assign responsibilities; gather existing data; set timeline; secure funding (see Unit 3).
JUNE	• Send out letter to landowners on stream; do press release and/or volunteer recruitment.
JULY	• Train volunteers and conduct stream corridor survey (SCS); collect datasheets and pictures.
AUGUST	• Compile the SCS data; archive for organizational use; send copies to MSTP or MDIFW.
FALL WINTER	• Write and review report. • Create an action plan for using survey data (may involve presenting data to municipal officials, applying for grants for water quality monitoring or best management practices to reduce pollution or improve riparian buffers, etc.).
Example 2	**Stream Corridor Survey (SCS) plus Watershed Survey (WS)**
MARCH–APRIL (Year 1)	• Organize project leadership; assign responsibilities; gather existing data; set timeline; secure funding (see Unit 3).
JUNE-JULY	• Send out letter to landowners on stream; do press release and/or volunteer recruitment.
AUGUST SEPTEMBER	• Train volunteers and conduct SCS; collect datasheets and pictures.
OCTOBER	• Compile the SCS data; archive for organizational use and send copies to MSTP or MDIFW. • The technical team may need to conduct follow-up visits of specific sites documented with Site Forms in or alongside the stream during the course of the SCS in order to further analyze the situation, rank severity of the problem or extent of highly valuable habitat, and then determine future action.
LATE FALL EARLY SPRING (Year 2)	• Write and review report and create an action plan for using survey data (may involve presenting data to municipal officials, applying for grants for water quality monitoring or best management practices to reduce pollution or improve riparian buffers, etc.). • Use knowledge gained from SCS to help focus and prioritize watershed survey efforts. Use the SCS report to maintain project momentum and generate interest in future survey work.
SPRING	• Conduct a WS (see Unit 6).

C2. *Secure Funding*

You most likely will have expenses associated with conducting a Stream Corridor Survey, though some small projects can be completed with fairly minimal costs. ***(See Unit 3 for more information about funding issues.)***

C3. *Communicate with the Public and Recruit Volunteers*

Communicating with the public to make them more aware of your project is a very important step in the survey process.

- Communicating through **letters** and **press releases** can be a good way to recruit volunteers.
- You may also consider soliciting **help from other groups** or organizations *(for more information, see Unit 3)*.
- You must send out letters to each of the landowners whose land you need to access. *(Instructions and sample letters are included in Unit 4 and Appendix E, respectively.)*

C4. *Determining the Study Area and Stream Reach Locations*

This is an important part of the planning process and is comprised of **three key steps:**

- Set the appropriate scale for the project
- Divide selected stream sections into survey reaches
- Name the reaches

If surveying your entire stream system is not feasible, develop a plan to prioritize sections based on: individual goals of the project, available resources, safety constraints, access concerns, and existing information on the stream.

C4a. Set the Appropriate Scale for the Project

Ideally, we would like all streams in the State of Maine to have SCSs performed along their entire lengths, including tributaries. Realistically, we all have limited time and resources.

If surveying your entire stream system is unfeasible, develop a plan to prioritize sections of the stream to survey based on the individual goals of your project, available resources, safety constraints, access concerns, and existing information on the stream.

Project leaders or steering committees may select survey locations themselves or in collaboration with local or state water quality or biologist personnel. Other projects allow their volunteers to choose the location(s) based on their personal interests.

Groups choosing to survey the entire stream may do so in one large, concentrated effort, or they may opt to do it in phases over time. If the primary function of your survey is education, you may opt to survey only the few reaches covered in training with the help of your technical advisors.

Once the scale of the survey is determined, and the survey area has been chosen, it should be marked on a copy of the topographic map of the watershed.

TIPS on **how to read topographic maps** can be found at:
http://erg.usgs.gov/isb/pubs/booklets/symbols/
and other resources on the Internet.

■ C4b. Divide Selected Stream Sections into Survey Reaches

The SCS involves assessing the overall characteristics of not just a single "point" on a stream, but rather a length of stream called a reach. As mentioned earlier, a stream reach is a relatively homogeneous stretch of a stream having a repetitious sequence of physical characteristics and habitat types. Reaches vary in length, typically between 100 - 1000 yards.

Stream reaches may be delineated in one of two ways: the **recommended method** is to delineate stream reaches in advance of survey, while the **Alternative Method** is to allow volunteers the discretion to identify reach endpoints while they survey.

Experience has shown that it is valuable for the project organizer to do a reconnaissance visit to possible access points in advance of the actual survey, whenever possible. This reconnaissance can identify sites the do not allow good access or which may be extraordinarily difficult to walk/survey.

■ C4b.1. Recommended Method — Delineating stream reaches in advance of the survey

The topography of the stream channel and banks is a major indicator of how homogeneous a reach is.

- Using a topographic map, you can identify sections of stream that have a certain slope to the stream or its banks/floodplain, or a certain channel shape *(Figure 5-1)*.
- Reaches identified and defined on topographic maps can be copied onto smaller topographic maps (or copies of the map).
- GPS coordinates for the reach endpoints may be provided to the appropriate volunteer groups. Since GPS coordinates can sometimes be erroneous, it usually is worth providing volunteers with a map.

Figure 5-1:

TOPO MAP FEATURES:

Stream Gradient

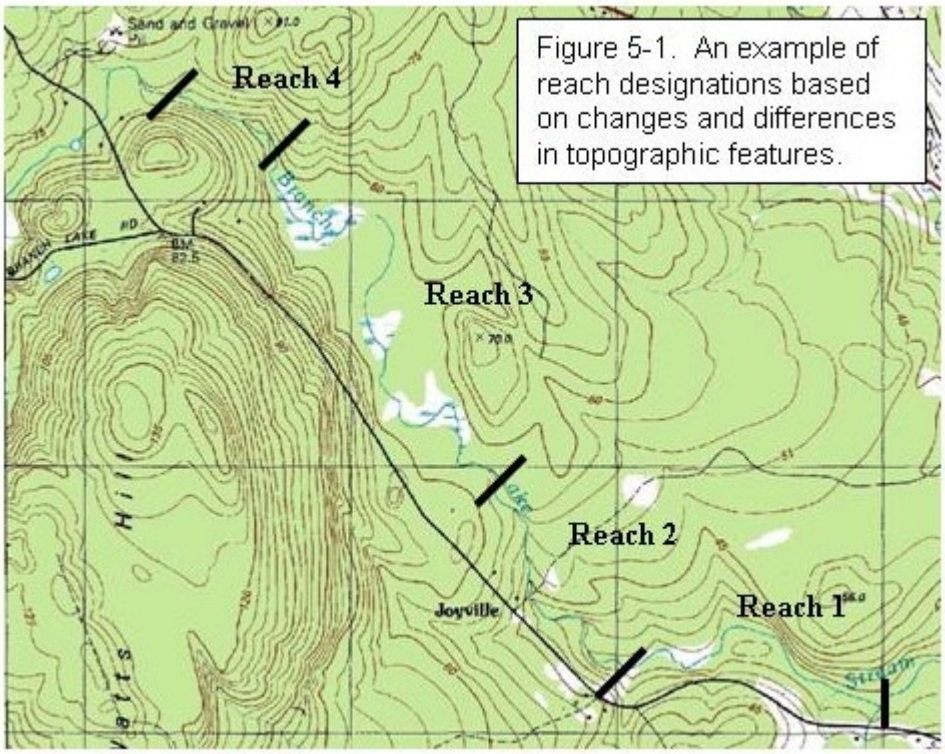
Stream Sinuosity

Width of Stream Valley

Tributaries

Wetlands

Road Crossings



Refer to the the online version of this publication to view the features of *Figure 5-1* more clearly in color. The publication can be found at http://www.maine.gov/dep/blwq/docstream/team/streamteam.htm

The following features, as depicted on your topographic map, will help you to delineate reach endpoints. ***(Example reaches used in the text below are shown above in Figure 5-1.)***

- **STREAM GRADIENT:**
  Follow the blue line of the stream. It will cross brown elevation contour lines as you follow it downstream or upstream. How closely spaced are the brown elevation lines it crosses?

  If the elevation lines are closer together *(see Reaches 2 and 4 in Figure 5-1)*, the stream is relatively steep. There may be more riffles and cascades in steeper sections.

  If the elevation lines are further apart *(see Reach 3)*, it is a relatively flat section of stream. There may be more runs or deadwaters in flatter sections of stream.

  Generally, noticeable changes in stream slope will designate most reach breaks.

- **STREAM SINUOSITY**:
  Sinuosity is the degree to which a section of stream resembles an "S" shape. Is the stream channel meandering (curving) a great deal *(Reach 3)*, or is it more straight *(Reach 4)?* Streams are not naturally perfectly straight, though they might be fairly straight in certain situations (e.g., high mountain streams underlain by bedrock). Historically, some streams in Maine were widened for flood control or log-drive purposes. Is there evidence that the channel may have been straightened on the topographic map? *(Look for this particularly in areas with wide stream valleys, where streams would naturally meander.)* Local residents, officials, or historical records and maps may help provide further evidence about possible stream modifications.

- **WIDTH OF STREAM VALLEY:** Areas on maps where steep elevation contour lines running parallel to the stream are located far away from the line of the stream indicate wide valleys *(Reach 3)* as opposed to areas where these contour lines are located very close to the stream line indicate narrow stream valleys *(Reach 4)*.

- **OTHER FEATURES:** Look for other marked features on the topographic map, such as **tributaries** entering the stream *(see the bottom of Reach 1)*, **wetlands** *(Reach 3)*, or even **land uses** *(transitions from rural to urban)* or **road crossings** to provide additional reach end points. If access on your stream is difficult or limited, you may need to use railroad tracks and road crossings as reach endpoints, particularly where one group surveys reaches upstream of the access point and one group surveys downstream of the access point.

- **MARKING STREAM FEATURES ON THE TOPOGRAPHIC MAP:** Once you have identified **reach breaks** *(endpoints)* based upon major changes in the gradient, sinuosity, valley width, crossings, and other features of the stream, mark them on your topographic map. Check the **length of the reaches** to make sure that they are an appropriate length. If one of your reaches appears to be too long (more than a 1/2 mile), take a closer look at it and see if you can subdivide it by doing a more sensitive analysis of the topographic map.

FIELD WORK MODIFICATIONS:

No matter how thorough a job you do defining reach breaks using topographic maps, volunteers may still need to make minor modifications when they get into the field.

These modifications could include dividing a pre-defined reach into two or more physically- or biologically-distinctive "sub-reaches."

For each sub-reach, a separate datasheet set will need to be completed. Still, defining reach breaks (particularly subtle ones) in the field is sometimes tricky and may require more experience than your average volunteer has.

For this reason, we recommend wherever possible that you carefully identify as many reach breaks in advance of the survey as you can.

■ C4b. 2. *ALTERNATIVE METHOD —*

Allow volunteers the discretion to identify reach endpoints while they survey

- **This may be useful for one-day surveys** covering a smaller section of stream, where the **primary purpose of the stream is education,** and where the **technical advisors are available** to advise volunteers on appropriate endpoints in the field.
- **This option may also be useful in larger surveys** where access points are a consideration. You may opt to divide volunteers into groups assigned to survey a certain sections of the stream (predetermined by road crossings, railroad crossings, or other prominent features), with the understanding that the volunteers will divide their section into reaches while in the field, filling out one datasheet for each reach. Having the volunteers bring maps of their assigned sections into the field will aid them in determining reach breaks.

■ C4c. *NAME THE STREAM REACHES*

For consistency, we have devised a relatively easy way to name stream reaches which allows you to know where you are on the stream and also to track reach numbers in all photographs taken within that reach. **Figure 5-2** illustrates an example of using this naming system.

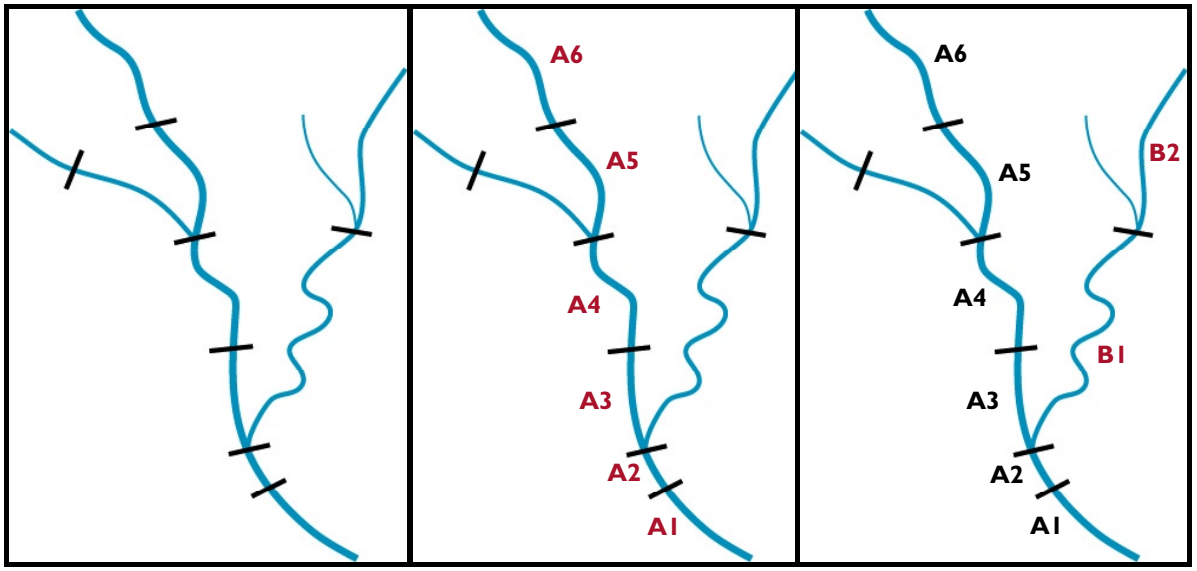
The name of any given reach consists of three parts as follows:

• **CAPITAL LETTER:** One capital letter represents the branch of the stream. **Your primary stream of interest is designated 'A'.** All branches off the main stem of the stream and all tributaries feeding into the stream are designated by a different capital letter (e.g., B, C, D, etc.) in alphabetical order *(see Figure 5-2)*. (When selecting a letter, use any letter in the alphabet except 'O' and 'Z' because they also can be easily confused with the numbers '0' and '2'. Flipchart templates can be found in Appendix H.)

• **NUMBER: Each reach within a stream branch receives its own number,** starting with '1' (from the most downstream section of the branch) and increasing upstream from there.

• **LOWER-CASE LETTER** *(optional)***:** If, in the course of the survey, the volunteers determine in the field that the survey reach needs to be broken down into **sub-reaches,** add a lower case letter (starting with 'a' for the most downstream sub-reach) to the end of the reach number. A reach may be divided into up to 11 sub-reaches (from 'a' to 'k') as necessary.

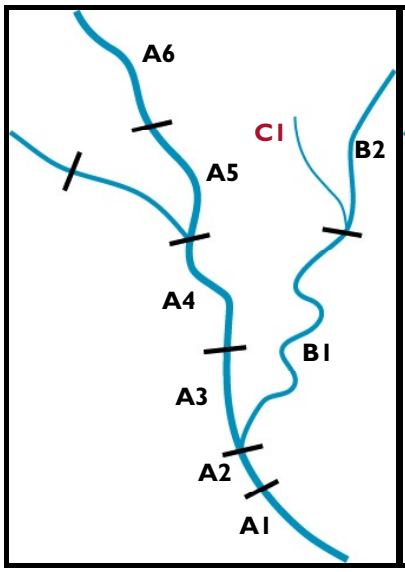
Figure 5-2:
Example of Stream Reach Naming Procedure



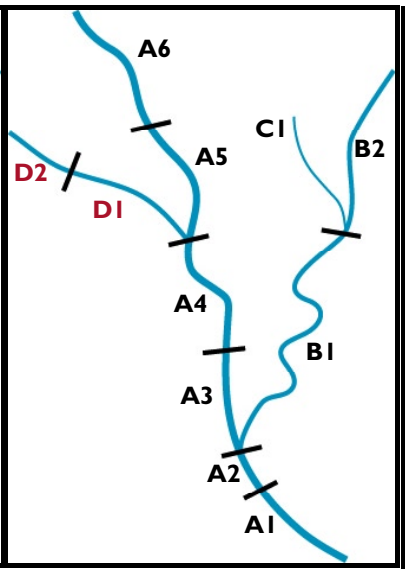
STEP 1: Mark all reach breaks on stream and its tributaries.

STEP 2: Starting with the downstream end of the main stem (labeled 'A'), name reaches 'A1', 'A2', etc., as illustrated above.

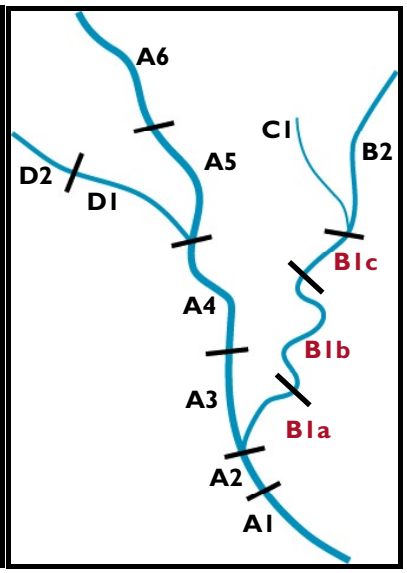
STEP 3: Name reaches for the most downstream tributary entering your stream 'B1', 'B2', etc., as illustrated above.



STEP 4: Name reaches for all tributaries entering tributary 'B' from the most downstream tributary ('C', etc.") to the most upstream trib ('D', 'E', etc., if necessary; not shown in this particular example).



STEP 5: Working your way upstream on the main stem, repeat Step 4 on all additional tributaries, being careful to assign each tributary a unique letter of the alphabet (EXCLUDING the letters 'O' and 'Z').



STEP 6: Final reach designations —Volunteers may divide reaches into sub-reaches in the field, keeping the original reach name (e.g. 'B1') as the prefix, and adding 'a', 'b', etc., starting downstream, as shown.

■ C5. *Gathering Materials* (equipment, datasheets, etc.)

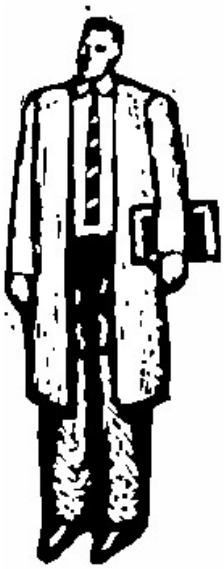
Stream habitat surveys can be conducted fairly economically.

C5a. EXPENSES may be limited to:

- Postage for landowner letters, copying of datasheets and reports, and buying disposable cameras/developing film. (Digital cameras, once purchased, provide photos for free.)
- Other materials may often be borrowed from either the volunteers or your technical advisors.
- Better-funded groups may opt to purchase some of the items.
- You may also want to provide some sort of refreshment (water/snacks), particularly for full-day survey events with volunteers. When coffee or lunch is provided, volunteer morale always rises!

C5b. TYPES of MATERIALS

You and/or your technical advisors will need to organize the following materials prior to training and encourage volunteers to bring what items they can. The amount of materials depends on the number of volunteers (and groups), you anticipate being part of the project . You may ask volunteers and technical advisors to bring some of these items; others you may have to obtain yourselves.



❑ **SAFETY EQUIPMENT:**

- First-aid kits
- Cell phones
- Field gear (water, sunscreen, insect repellent, long sleeve shirts/pants [optional, but recommended]; volunteers are encouraged to pack a spare set of clothes in the unlikely event they fall in the water)
- Hand-cleaning wipes
- Blaze orange clothing **(We recommend NOT conducting surveys during hunting season; however, if you must, blaze orange is an absolute necessity.)** Blaze orange clothing is a worthwhile precaution in high traffic areas. Make sure it is reflective clothing if working close to dawn or dusk.

❑ **PAPERWORK:**

(All SCS paperwork listed here, except topographic maps, is included and/or referenced in Appendix J.)

- **Topographic map:** Copies of U.S. Geological Survey (USGS) 7 1/2 minute topo maps, or other maps such as GIS maps, of the stream area with pre-assigned reaches or segments marked on them. These can be supplemented or substituted by regular street maps or an atlas/gazetteer if needed, though they tend to show features at a larger, less-detailed scale. Some websites offer the ability to print portions of topo maps; *(contact the MSTP for more details)*.
- **SCS Field Datasheets:** Include several extra sets in case volunteers want to have their own copy, or need to divide a reach into multiple sub-reaches *(Appendix J)*. (***NOTE:*** The datasheet sets are available in two GPS-type formats: UTM Zone 19 and Latitude/Longitude. The UTM system is preferred because that is what most Maine state agencies use [including MDEP and MDIFW], however Lat/Long is still an option.)

- **SCS Instructions:** This reference document contains detailed information about each of the questions on the SCS datasheet *(Appendix J)*.
- **RGA Picture Key:** This 15-page reference guide with color pictures is an invaluable tool that helps translate complex Rapid Geomorphic Assessment jargon into useable information *(Appendix J)*.
- **Site Form Datasheets:** Any survey organization that will be identifying NPS pollution sites as part of a larger subsequent watershed survey, or who simply want to document very specific locations along the survey reach, will need to provide volunteers groups with a set of site survey datasheets *(Appendix K)*.
- **Landowner letter:** A copy of the letter sent to landowners prior to the survey may be useful (optional) *(Appendix E)*. A list of landowners requesting volunteers to stay off their property can help volunteers avoid confrontation.
- **Clipboards:** Clipboards with covers are preferred to help keep papers dry; 1-3 per group, depending on the division of group responsibilities.
- **Pencils** or other **writing implements**
- **GPS unit and adequate batteries:** A GPS unit is recommended, but not mandatory. If you don't have this equipment, try to at least submit a copy of a map indicating where you surveyed, along with a detailed description.
- **Camera:** Digital cameras (and batteries) are preferred. If not using digital cameras, include adequate film as needed. It is recommended when having film developed to request a CD copy of the prints.
- **Photograph ID "Flip Charts":** Useful for helping identify where each photo was taken (Appendix H).
- **Tape measure,** string, or twine (at least 25 yards) for taking stream width measurements (optional).
- **Yard/Meter stick** for taking stream depth measurements.
- **Thermometer for measuring water temperature** (optional, but recommended): A number of companies on the Internet sell inexpensive armored thermometers that are best suited for this purpose. Aquarium stores may have some too. Contact the MSTP if you need additional information.
- **Stopwatch** or watch with a second hand for estimating flow rate (optional).
- **Macroinvertebrate collection supplies** (optional): small bucket, shallow white pan/white plastic plate/bottom of a white plastic jug, tweezers/soft brush, ice cube trays for sorting, magnifying glass, and macroinvertebrate identification keys. For more rigorous macroinvertebrate surveys, a net (with handle) with fine mesh netting (500 µm mesh) is recommended. [To locate macroinvertebrate identification keys and field guides, search the Internet (including online distributors), check with organizations such as the Izaak Walton League of America, River Network, Adopt-A-Stream Foundation, etc., or contact the MDEP Maine Stream Team Program.]

(See Unit 3 for information on possible sources of funding and resources to help obtain materials for a SCS survey.)

■ C6. Choosing Reaches to Be Surveyed/Assigning Volunteers to Reaches

(This section continues the discussion about volunteer recruitment, choosing the reaches to be surveyed, and the assigning of volunteers to reaches.)

■ C6a. Determine how many volunteers you need

The number of volunteers you will need for a survey depends on two things: the number of volunteers per "group" (a subset of your total number of volunteers) and the number of reaches your project hopes to survey. It is important to try to plan for these numbers in advance of the event as much as possible. Still, it is important to keep in mind that you must flexible on the day of the event in case the actual number of volunteers, who show up to participate, is less than what you had expected. *Flexibility* is a critical trait an organizer must have for these types of projects.

■ C6b. Number of volunteers per group

The recommended number of people per group is two - four (2-4), including one experienced technical leader, if possible. An ideal number of people per group is usually three (3), given the types of tasks associated with conducting a survey. This number helps ensure there are enough people to complete the various tasks within a reasonable amount of time, while avoiding having extra people becoming bored.

■ C6c. What kind of volunteers are needed?

Because of the risks inherent in working in, and close to, streams, make sure your volunteers are in excellent health and physically able to participate in the survey. Also, take volunteer age into account. Teens may perform the survey with adult supervision, but these surveys are not recommended for preteens or younger unless many adult supervisors are involved. Whenever working with kids, carefully scout out and select safe (i.e., not steep, slippery, deep-water, etc.) survey locations. *(See Unit 4 for more information.)*

■ C6d. Where do you find volunteers?

See Unit 3 for ideas.

■ C6e. What do you tell volunteers?

This is an in-stream technique. It is your responsibility as the volunteer recruiter to make sure the volunteers understand what the survey entails, and to prepare them for the conditions they are likely to encounter.

GENERAL LOGISTICS AND SAFETY ISSUES:

- **Location and time**
- **Water depth** (estimated): What kind of footwear do they need?
- **Degree of difficulty:** Some stream reaches are more physically challenging than others. Will they be expected to hike through the forest, shrubby riparian lands, marshy wetlands, or on very steep or uneven terrain?
- **Special safety considerations:** Be sure to scout these out well in advance of the survey, and make volunteers aware of potential hazards (weather, wildlife, etc.). Always make sure to state how slippery stream channels and banks can be. *(See Unit 4 for more information.)*
- **Contingencies:** Provide your phone number in case a volunteer must cancel, or to find out plans in the case of foul weather.
- **What to bring:** See checklist in section C-5.

■ C6f: Divide up the survey tasks/roles and assign them to volunteers

The division of tasks and roles among various members of each reach-surveying team will ultimately depend upon the number of volunteers who show up to the survey event and the resulting size of these teams (groups). **Table 5-3** presents an example of how survey responsibilities might be divided within an example team made up of three (3) volunteers. Keep in mind that this is an example; it may need to be modified according to team size and individual interests.

Table 5-3:

Division of tasks and roles among survey team of 3 members — an example

The decision of whether or not tasks are required depends on: (1) the goals of the survey (e.g., did the project leaders choose to include the use of Site Forms to add that data to a related watershed survey?) and (2) the availability of certain equipment (e.g., GPS unit).

SURVEY TASKS	VOLUNTEER MEMBER ROLES			
	Required	Volunteer 1	Volunteer 2	Volunteer 3
Make observations of stream channel, bank, riparian zone, geomorphology, nearby land uses, pollution (if any), organisms, etc.	YES	X	X	X
Fill out datasheets:				
Stream corridor habitat/ pollution conditions	YES	X		
Sketch of reach	YES	X		
Rapid geomorphic assessment (RGA)	YES	X		
Individual Site Forms	Optional		X	
Take photographs	YES		X	
Make measurements of stream depths and widths (widths may be estimated)	YES			X
Manage the Photograph flip chart (Appendix O)	Recommended			X
Collect GPS coordinates	Recommended			X
Make measurements or complete inventories of: temperature, water velocity of stream, quick macroinvertebrate inventory	Optional			X

■ C6g: Choose the reaches to be surveyed and then assign volunteers

Once you have determined reach breaks and named all the reaches of interest, an important step is to estimate how many volunteers and group leaders (technical staff) will be available to actually conduct the survey. **The recommended method is to first estimate the number of volunteers, based upon responses from your conversations and correspondences with people, and use the estimate for preliminary planning of the survey**. On the day of the event, count the number of volunteers and technical staff present. This number will determine the actual number of reaches you and your volunteers are reasonably able to survey.

■ **There are a number of considerations to take into account when estimating the number of reaches to be surveyed during a project.**

Indicate on a "master" copy of the project map which groups will cover which sections. Keeping in mind the considerations and constraints, divide the survey reaches into sets for each group (e.g., Group #2 will survey reaches B1, B2, and B3). You may not be able to survey all the reaches you had hoped to, so make sure to prioritize reaches you are most interested in surveying before the actual survey day.

- **REACH LENGTH:** Most of the time spent surveying a reach is spent walking the length of it, observing conditions as you go along. Longer reaches, obviously, take more time to survey. A "ballpark" estimate for the amount of time to walk and survey a 1/2 mile reach, including the completion of datasheets, is about two hours. Circumstances that can add time to this estimate include trekking through the stream and along its banks (versus hiking along cleared paths); numerous meander bends (as opposed to walking a roughly straight line); occasional deep water; and sometimes-dense riparian zone shrubs. Also, when volunteers assess their first-ever reach using these techniques, it generally takes longer. Overall, the speed of these assessments increases as one gains more experience.

- **ACCESS:** Are there easy access points to get into and out of the stream? Where access points are plentiful, volunteers can leave a second car near the end of their section. This allows them to walk their section of the stream once rather than twice. This can significantly reduce the amount of time needed to survey.

  On the flip side, when access is limited to a single point, volunteers will have to trek the length of the stream twice (once to get in and once to get out), reducing the amount of stream they are able to cover in a day. Similarly, if there are no good access points, and volunteers must hike a significant distance before reaching the stream, survey time may be severely limited.

- **STREAM CONDITIONS:** How difficult is it to walk the stream channel? Deep or flat sections, particularly wetland sections, can be difficult or impossible to walk through. Try to avoid walking in marshy, mucky soils or sediments - they are tricky to navigate and you may lose your boots or get stuck! Steep sections or sections with uneven or slippery streambeds or streambanks can make for treacherous walking. Groups should be advised to take their time navigating through these sections. Wherever possible, check conditions in advance to give you a better idea of the type of obstacles you will be likely to encounter, and how that may impact time constraints. In any situation, safety is the top priority. Avoid walking any sections that appear too deep or dangerous.

- **VOLUNTEER EXPERIENCE LEVEL AND PHYSICAL REQUIREMENTS:** With the exception of the cover sheet, the photograph log, and the site sketch, the SCS datasheet is filled out once volunteers have finished walking the length of the reach. For volunteers experienced with the datasheets, it may take only 10 minutes (per reach) to fill out the entire set of datasheets. Newer volunteers who are unfamiliar with the terminology will need to rely more heavily on supplemental materials (RGA picture key, datasheet instructions, etc.), and could take 20 - 30 minutes to fill out the datasheet their first time. Also, volunteers who are not adequately prepared for the work, or who are not strong or healthy enough to complete the work, can seriously impact the efficiency of the survey process. Make sure volunteers know in advance what they can expect, for safety purposes first and foremost, but also to make best use of group surveying time.

- **TRAINING SCHEDULE:** If you are hoping to do all of your training (indoor and out) and surveying on a single day, keep in mind that you are seldom able to begin surveying before 11:00 AM unless the volunteers are fairly experienced.

- **HOW MUCH TIME DO THE VOLUNTEERS WANT TO CONTRIBUTE TO THE SURVEY:** It is suggested that volunteers be contacted in advance to determine how much time they are willing to put into the survey efforts.

- **EXPECT THE UNEXPECTED:** Even the best-planned surveys usually do not cover as much ground as hoped. There are many problems or situations that can be encountered in the field, which can reduce the number of reaches that can be surveyed.

C7. Training Volunteers

Most of the training details are arranged by your technical team advisors. Below is some basic information that should help you to know how the classroom and field training works.

CLASSROOM TRAINING

RESPONSIBILITIES:

- **Trainers:** Classroom training should be conducted by a member of the technical team with extensive experience with both streams and the SCS protocol (usually someone from MDEP or MDIFW). The trainers usually provide their own computer laptops and projectors.
- **Setup People for Training:**
  Training organizers should consider the following when setting up a training room:
  √ projector screen or blank wall
  √ accessible outlets
  √ extension cords
  √ chairs
  √ tables
  √ restroom location
  √ refreshments

TOPICS:

The training includes background information on watersheds, stream ecology, nonpoint source pollution, fluvial geomorphology, and an overview of how the survey is conducted. Don't forget safety topics!

DURATION:

Classroom training typically is about 2 hours, including a 15 minute break

TIMING OF TRAINING:

Some groups request to have classroom training on a day different from the "field day" to allow for more time in the field.

FIELD TRAINING

Ideally, each volunteer field group has one member of the technical team (selected by the steering committee) to lead the group through the field portion of training. (Names of qualified individuals can be obtained from the MDEP Maine Stream Team Program or the Fisheries Research Section of the MDIFW.)

There are two primary methods of conducting field training:

OPTION A

- The training is essentially done while the assigned technical leader points out features along the course of the reach and then assists the group with filling out data sheets. Once the volunteers are comfortable with the survey process, they may proceed with the survey without direct supervision, though the technical leader typically stays with the group that day.
- **DURATION:** The duration of this type of field training is essentially less than about 15 - 20 minutes of orientation (quickly reviewing the datasheets). The rest of the time is actually spent walking, making observations, and recording actual (not practice) data.

OPTION B

- Field training can also be conducted as a larger group, with one (or a small group) of technical leaders walking the large group through the steps of the field survey process. This is useful where technical support is limited, for smaller groups of volunteers, for groups that conduct training on a separate day from the survey, or for when the primary purpose of the survey is to educate many people about the stream all at once. Special care will need to be taken to ensure that each volunteer is comfortable with the process and each of the questions on the datasheet.
- Conducting a practice survey of a reach (including the filling out of data sheets and answering any questions) prior to an actual survey is strongly recommended. This assists volunteers to be aware of the stream corridor features to which they are supposed to be paying attention, as they walk along their reach.
- **DURATION:** Field training is about 1 - 1.5 hours.

C8. Conducting the Survey

• Once volunteers are trained and comfortable with the process, they may conduct the SCS without supervision from the technical team. Experience has shown that volunteers typically are willing to commit to a one-day training and survey effort. Sometimes volunteers are willing to complete surveys on additional reaches after the initial training/survey has taken place.

• If volunteers stumble across a question with something they see on the survey or with one of the questions on the datasheet, they are encouraged to make a note of it (including location info), take a picture (if applicable), and follow up with either the volunteer coordinator or the technical team at the end of the survey.

• **Remember to make sure volunteers are aware of safety issues, respect the wishes of landowners, and have fun.** Don't forget to arrange a way to collect all completed datasheets, cameras, and any other borrowed materials.

(*NOTE:* **One critical concept to remind volunteers of is to walk the entire length of the reach before filling out survey datasheets for that reach.** Habitat/geomorphology and pollution conditions may change substantially over the course of walking a reach! Also, stream conditions immediately upstream or downstream (typically 50 -100 ft) of stream crossings/culverts can be very different than remaining portions of reaches.

Care should be used when filling out datasheets to keep this situation in mind and recognize that conditions around culverts and bridges may not be representative of the entire reach of interest. Additional data sheets [e.g., the Site Forms in *Appendix K*] or methods and datasheets [e.g., the Maine Road Stream Crossing Survey technique outlined, but not detailed, in *Appendix M*] may be useful for highlighting the unique condition in and around these features, which often have significant impacts on streams.)

C9. Managing the Data

The volunteer group's (assigned) data manager is responsible for compiling the data at the end of the survey. A list of general data manager responsibilities is provided below.

• Make sure that at least one datasheet set is submitted for each reach and quickly checked for obvious errors.

• If groups have submitted multiple datasheets completed by different volunteers for a single reach (as frequently occurs in the field portion of the training), the data manager should use his/her discretion to compile the responses for that reach onto a single completed datasheet. The data manager may need to contact the volunteer(s) as soon as possible to clarify their responses.

• If a single reach was broken into more than one reach in the field by volunteers, then it may be necessary to amend the name of the reach so that this alteration is reflected in the name (e.g. Reach A3 becomes Reach A3a and Reach A3b, each having its own set of datasheets).

• The data manager should collect all the digital photo files or photographs and label them with a sensible name (ideally including a code that identifies date and location). If possible, use a computer photograph program to modify the photograph file size to 1 MB of memory or less (300 KB is recommended).

• Finally, the data manager is encouraged to complete the SCS "Photolog Summary" file — a Microsoft Excel template available from the Maine Stream Team Program (MDEP). This file catalogs all pictures taken during the survey. The file records each photograph's name (or number), reach name, GPS location, and description of what is seen in the photograph. (This step reduces any confusion the MSTP may encounter when reviewing and archiving the data.) Be sure to include file extensions such as "jpg," "tif," or "bmp" in the name if you are providing electronic pictures. By providing this information, your survey pictures will be able to be efficiently uploaded into the survey database, which in turn will aid future users in data interpretation.

• When all of this is done, the data manager should submit the following information to the MSTP (preferred) or MDIFW's Fisheries Research Section *(see Appendix C for contact information):*

√ Hardcopies of the final datasheets: One completed datasheet set per reach. (Make sure the copies are readable or send the originals.)

√ Survey photographs: in electronic (preferred) or hard-copy format.

√ Electronic copy of SCS Photolog Summary: One Microsoft Excel file per project, filled in with information on all survey photographs you are submitting.

(***NOTE:*** For surveys that have included use of the Site Form datasheets, the data manager will also be responsible for managing this set of information and files separately from the SCS-related survey data and photos. (Use file-naming-codes that distinguish these files and sheets from the SCS files and sheets.) The management of that data is up to the discretion of the data and project managers, but in general it is recommended to use your project's predetermined watershed survey data management techniques to catalog this data *(if applicable)*. Contact the MSTP if more advice is needed.)

D. Reports

Analyses and reports on SCSs are produced by the Maine Stream Team Program as time permits. Projects that are given priority for report writing by the Maine Stream Team Program are based upon such conditions as: Maine Stream Team Program staff were involved in the project (including field work), multiple reaches were surveyed for the project, or the stream is on MDEP's list of impaired waterbodies.

Regardless of whether reports are written, all data that is submitted to the Maine Stream Team Program is entered into its statewide database.

Volunteer groups are also free to write their own reports.

E. Next Steps

After you have completed the SCS and its report (if applicable), refer to Unit 7 for suggestions on how to take action.